

AMBIENT AIR SURVEY IN MISSISSAUGA

APRIL 1978

ARB-TDA REPORT No. 51-80

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Ministry
of the
Environment

The Honourable
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Minister

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Deputy Minister

AIR RESOURCES BRANCH
Technology Development and Appraisal Section
Monitoring and Instrumentation Development Unit

ARB-TDA-Report No.51-80

AMBIENT AIR SURVEY
IN
MISSISSAUGA
APRIL 1978

Ontario Ministry of the Environment
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Toronto, Ontario

August 1980

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01. SUMMARY

An ambient air monitoring survey was undertaken by the Monitoring and Instrumentation Development Unit of the Air Resources Branch in the Mississauga area during the period of April 10 to April 23, 1978. The main purpose of this survey was to monitor the air quality, specifically, sulphur dioxide, oxides of nitrogen, hydrogen sulphide and total hydrocarbons in the vicinity of Tricil Limited and the Gulf Canada Products Company - Clarkson Refinery (formerly Gulf Oil Canada Limited). These pollutants were monitored for a total of 285 hours during 15 monitoring periods.

Another purpose of the survey was to monitor the total suspended particulate matter, including sulphates, total carbon and free carbon. A gas chromatograph unit was also set up to monitor the concentrations of methane, ethane, ethene, acetylene, propane and propene, cyclopropane, vinyl chloride monomer, n-butane, n-pentane, and n-hexane.

The overall average ground level concentration of sulphur dioxide was 0.02 ppm with an associated standard deviation of 0.05 ppm. The criterion for the hourly average concentration of sulphur dioxide (0.25 ppm) was exceeded for approximately 1% of the total time (3.5 out of 285 hours). The largest one-hour average ground level concentration was 2.05 ppm and was recorded on April 23. During this time, the mobile air monitoring unit was located approximately 0.4 km downwind of the Gulf refinery. The results of the wind rose/concentration analysis done for this monitoring period suggested that the Gulf refinery could have been the source of sulphur dioxide.

The overall average ground level concentration of the oxides of nitrogen was found to be 0.03 ppm with a standard deviation of 0.03 ppm. The criterion for the hourly average concentration of the oxides of nitrogen (0.20 ppm) was exceeded on two separate occasions, for a total of 6 hours (approximately 2% of the total time). Both excursions above the criterion, of which 0.40 ppm was the largest one-hour

average concentration recorded, were attributed to vehicular traffic. Otherwise, generally low concentrations of these contaminants existed in the area.

Concentrations of hydrogen sulphide were of interest in the vicinity of the industrial waste treatment plant - Tricil. The overall average ground level concentration and associated standard deviation were both found to be 0.004 ppm. The concentration level of this contaminant exceeded the criterion for the hourly average concentration of 0.02 ppm for approximately 1.5 hours or 0.5% of the total time. Of the three monitoring periods showing concentrations above the criterion, two were attributed to the effects of the hydrogen sulphide analyzer not being stabilized after a calibration and before beginning to monitor. The remaining monitoring period showed consistently high concentrations. These were recorded on April 14 when the monitoring van was located at the Ministry of the Environment sewage plant. The high concentrations were assumed to originate from the sludge storage lagoons associated with and located near the sewage plant. In general, low concentrations of hydrogen sulphide were found to exist in the Mississauga area.

For total hydrocarbons, the overall average ground level concentration was 2.16 ppm with an associated standard deviation 0.81 ppm. The largest one-hour average concentration was 12.7 ppm recorded on April 17; however, this value was assumed to have originated from vehicular traffic.

A gas chromatograph unit was set up for a more complete hydrocarbon analysis. The hydrocarbons analyzed and their overall average concentrations were as follows: methane (0.84 ppm), ethane (0.006 ppm), ethene (0.11 ppm), acetylene (0.02 ppm), propane and propene (0.03 ppm), cyclopropane (0.006 ppm), vinyl chloride monomer (0.04 ppm), n-butane (0.06 ppm), n-pentane (0.01 ppm), and n-hexane (0.005 ppm). In general, it was found that the existing concentrations of hydrocarbons were at background concentration levels.

In order to establish ambient air mass loadings of total suspended

particulate matter in the vicinity of Gulf and Tricil, a hi-volume sampler was set up on top of the mobile air monitoring unit. The overall average concentration for total suspended particulate and the average and relative concentrations of the components that were analyzed were as follows: total suspended particulate - 43 $\mu\text{g}/\text{m}^3$; sulphates - 9.2 $\mu\text{g}/\text{m}^3$, (21%); total carbon - 7.3 $\mu\text{g}/\text{m}^3$, (17%); free carbon - 3.8 $\mu\text{g}/\text{m}^3$, (9%).

02. INTRODUCTION

As requested by the Central Region of the Ministry of the Environment, the Monitoring and Instrumentation Development Unit of the Air Resources Branch conducted an ambient air survey in Mississauga during the period of April 10 to April 23, 1978.

The purpose of this survey was to monitor the air quality, specifically, sulphur dioxide, oxides of nitrogen, hydrogen sulphide and total hydrocarbons in the vicinity of Tricil Limited and the Gulf Canada Products Company - Clarkson Refinery (formerly Gulf Oil Canada Limited).

As well as the pollutants listed above, the Mobile Air Monitoring (MAM) unit also monitored the concentrations of methane, carbon monoxide and ozone. The Central Region also requested information regarding the identification and concentration of total suspended particulate matter in this area. A Hi-Volume sampler located on top of the MAM unit was set up to perform this task.

For a more detailed analysis of the hydrocarbons, a gas chromatograph (GC) was set up within the MAM unit. The hydrocarbons analyzed were methane, ethane, ethene, acetylene, propane and propene, cyclopropane, vinyl chloride monomer, n-butane, n-pentane, and n-hexane.

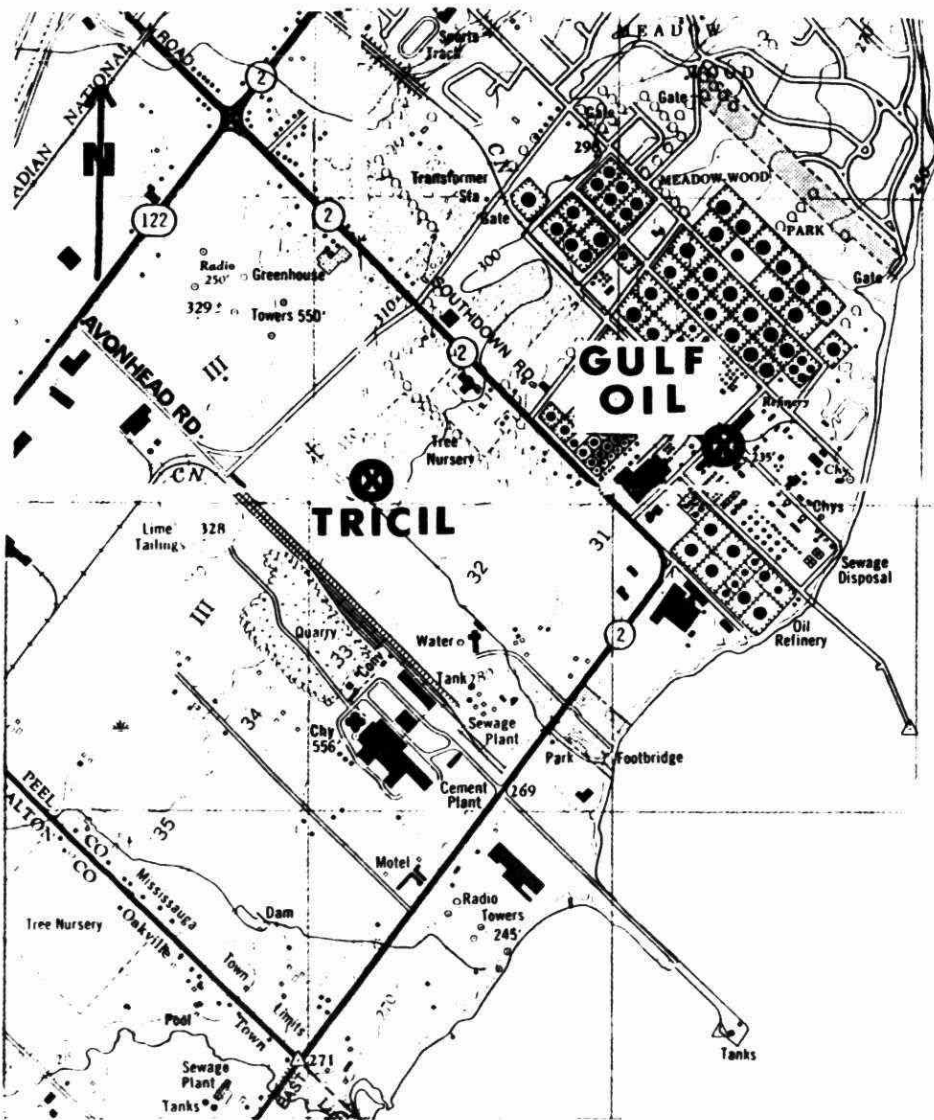
03. SOURCE DESCRIPTION

The southwest area of Mississauga was the area surveyed. Tricil Limited, an industrial waste treatment plant located 1.5 km NE of the Mississauga-Oakville town limits and 1.1 km SW of Highway #122 and the Gulf Canada Products Company - Clarkson Refinery, located approximately 2 km from the Mississauga-Oakville town limits and 1 km west of Highway #2 were the two major plants located in this survey area. The refinery was under an expansion phase during the survey.

The UTM co-ordinates of the reference points used during the survey were as follows:

Tricil	06112-48171
Gulf (main stack)	06124-48172

The sources and surrounding area are shown in Map #1, page 6.



MISSISSAUGA 11 - 1978

SOURCES

TRICIL & GULF

0 1 km

Map #1

04. SURVEY TECHNIQUE

A 1975 General Motors Corporation Transmode (MAM unit) was utilized to monitor air pollutants in the Mississauga area. The unit was equipped with an automated data acquisition system (Hewlett-Packard 9830A mini-computer system) and on-board twin electric generators. Automated and independent continuous monitoring capacity was a major feature of this unit. The Hewlett-Packard 9830A mini-computer system performed initial data analyses in the field, but the final data analyses were carried out by a larger system located within the Air Resources Branch at 880 Bay Street in Toronto.

The MAM unit had permanently installed analyzers for the measurement of sulphur dioxide, hydrogen sulphide, carbon monoxide, ozone, total hydrocarbons and nitrogen oxides. Meteorological instrumentation for monitoring wind speed, wind direction, relative humidity, temperature, barometric pressure and solar radiation was also included in this instrumentation package. A gas chromatograph (GC) unit was set up for monitoring hydrocarbons. See Table 1, page 8, for a listing of the above.

Following an assessment of wind direction and wind speed, suitable ambient air monitoring sites were chosen. Air quality was continuously monitored for at least one hour at each site.

A standard Hi-Volume sampler mounted on top of the MAM unit was used for the monitoring of total suspended particulate matter, total and elemental carbon, and sulphates. Glass-fibre filters were used as the collection media.

Ambient air hydrocarbon samples were extracted by a sampling loop and analyzed by the GC for the various hydrocarbons listed in the Introduction -Section 02 page 4.

Table 1: INSTRUMENTATION - GMC

<u>Instrument</u>	<u>Manufacturer</u>	<u>Analytical Technique</u>	<u>Maximum Sensitivity (Full Scale)</u>
H ₂ S Source	Hartmann & Braun (H&BPrüfgasgenerator)	N/A	N/A
H ₂ S Analyzer	H&B Picos	electrochemical	0.05 ppm
SO ₂ Source	H&B Prüfgasgenerator	N/A	N/A
SO ₂ Analyzer	H&B Picoflux 2	conductometric	0.3 ppm
O ₃ Analyzer/Source	Bendix 8002	chemiluminescent	0.05 ppm
NO _x , NO ₂ , NO Analyzer ²	Bendix 8101-B	chemiluminescent	0.5 ppm
CO Analyzer	H&B Uras 2T	Infrared Absorption	50 ppm
THC, CH ₄ , THC-CH ₄ Analyzer	Ingenieur - Produktions-Gruppe München (IPM) RS-5	Dual flame ionization detector	50 ppm THC (as CH ₄)
Hg Analyzer	Scintrex HGP-2	Ultra-violet Absorption	200 ng/m ³
CO, THC, THC-CH ₄ , CH ₄ source	Matheson	compressed gas	N/A

<u>Instrument</u>	<u>Manufacturer</u>	<u>Scale</u>
**Wind speed	Lambrecht gmbH	km/hr
**Wind Direction	Lambrecht gmbH	degrees
Temperature	Weather Measure (WM) T621	°C
Relative humidity	WM-HM-IIIP	percent
Barometric pressure	WM-BM70-B242	millibars
Solar radiation	WM Star Pyranometer	watts/cm ²

** These wind indicators are located on top of a 10-metre retractable mast.

05. MONITORING TECHNIQUE

Sample Collection

The ambient air samples were taken at a constant flow rate of approximately 0.2 cubic metres/min by a probe located on top of the MAM unit whose orifice was located approximately 5 metres above ground level. Air samples entered a manifold where each analyzer was parallel tapped with a minimal length of Teflon sampling line. This arrangement ensured little or no sample degradation due to ground level sources (eg. vehicular traffic).

Instrumentation - Analyzers

The instruments associated with the MAM unit are presented in Table 1, page 8.

Instrumentation - GC and Hydrocarbon Sample Collection Methods

The analysis of hydrocarbons in ambient air was performed by a Hewlett-Packard Gas Chromatograph (HP 5830A) and a microprocessing unit (HP 18850A GC terminal). Operating parameters were monitored automatically by the microprocessing unit once the programme was entered.

With respect to the GC, the column consisted of 4.25 m of SS tubing, 2 mm I.D., packed with Phenylisocyanate/Porasil C, 80-100 mesh, operating at a temperature of 0°C. Nitrogen, flowing at 30 ml/min was used as the carrier gas and a sampling loop of 5 ml volume was used for sample extraction. The GC was equipped with a flame ionization detector (FID) to detect the hydrocarbons. No known interferences were observed under these conditions, thus quantitative analysis could be performed. Laboratory testing indicated that an accuracy of better than 10% with respect to the concentration, could be achieved.

The GC was calibrated by the use of a stainless steel bellows pump

which extracted a sample of air with a known concentration and flushed this sample through the 5 ml sampling loop. From there, the sample was injected on the column by the carrier gas. These standards were contained in multi-layer aluminized (Mylar) bags.

Meteorological Analysis

Meteorological conditions were monitored on a continuous basis by the instrumentation in the MAM unit. (See Table #1, page 8.)

Calibration

Analyzers and sources were calibrated before the survey. During the survey, the calibration of the analyzers was checked at least once every day using calibrated sources and built-in electronic circuitry. All monitors were found to be stable and the calibration remained within the prescribed limits throughout the duration of the survey. Immediately following completion of the survey, all instruments were rechecked in the laboratory and all calibration statistics were found to be satisfactory.

06 MONITORING SITE LOCATIONS

Ambient air monitoring sites are indicated on Map #2, page 12 and the associated descriptions are presented in Table #2, page 13. Hi-Volume and hydrocarbon (GC) monitoring sites are also shown on Map #2, page 12 and their associated descriptions are presented in Tables #3 and #4, page 14.

MISSISSAUGA 11 SURVEY

1978

MONITORING SITES

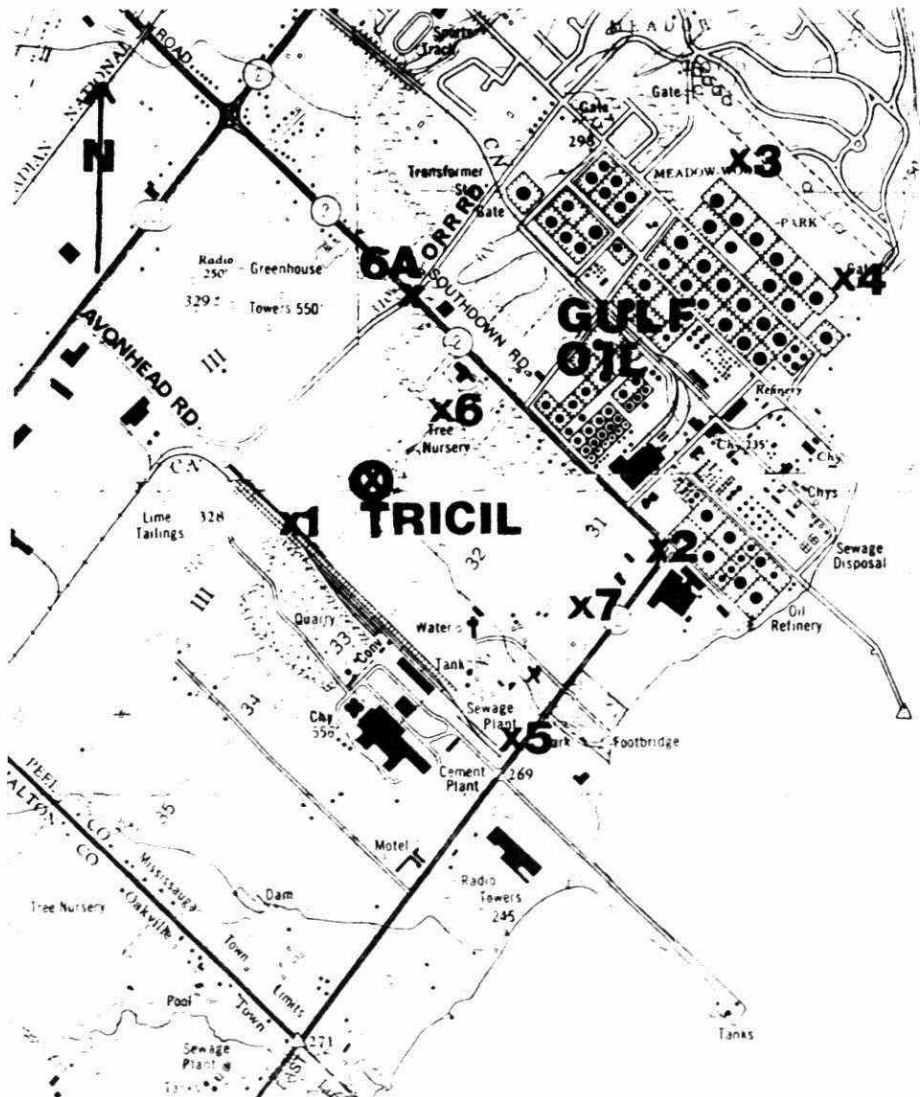


TABLE # 2
MOBILE AIR MONITORING SITES
MISSISSAUGA SURVEY - 1978
(MISSISSAUGA II # X)

<u>Site (X)</u>	<u>Map I.D.</u>	<u>Location and U.T.M. Co-ordinates</u>	<u>Distance (km)</u>	<u>Bearing (DEG)</u>	<u>Date (1978)</u>
1	1	Avonhead Rd., 250 m SW of Tricil (06109-48169)/Gulf	1.5	260	April 10
2	2	Lakeshore on Southdown Rd (06122-48167)/Tricil	1.0	105	April 11
3	3	Meadow Wood Park (06125-48182)/Gulf	0.9	005	April 12
4	4	Park at end of Apple Lane (06128-48177)/Gulf	0.7	040	April 13
5	5	MOE Sewage Plant (06117-48162)/Tricil	1.0	150	April 14
6	4	Park at end of Apple Lane (06128-48177)/Gulf	0.7	040	April 15
7	4	Park at end of Apple Lane (06128-48177)/Gulf	0.7	040	April 16
8	6	Tree Nursery West of Gulf (Sheridan) (06114-48173)/Gulf	0.9	275	April 17
9	6	Tree Nursery West of Gulf (Sheridan) (06114-48173)/Gulf	0.9	275	April 18
10	6	Tree Nursery West of Gulf (Sheridan) (06114-48173)/Gulf	0.9	275	April 18
11	7	Gulf Parking Lot (06119-48166)/Gulf	1.1	220	April 19
12	7	Gulf Parking Lot (06119-48166)/Gulf	1.1	220	April 19
13	2	Lakeshore on Southdown Road (06122-48167)/Gulf	0.4	205	April 20
14	2	Lakeshore on Southdown Road (06122-48167)/Gulf	0.4	205	April 21
15	2	Lakeshore on Southdown Road (06122-48167)/Gulf	0.4	205	April 22

TABLE # 3

HYDROCARBON SAMPLING SITES

<u>Sample #</u>	<u>Map I.D.</u>	<u>Location and U.T.M. Co-ordinates</u>	<u>Date 1978</u>
3	5	MOE Sewage Plant (06117-48162)	April 14
4	5	MOE Sewage Plant (06117-48162)	April 14
5	6	Tree Nursery W. of Gulf (Sheridan) (06114-48173)	April 17
6	6A	Intersection of Orr & Southdown Rds (06113-48177)	April 17
7	6	Tree Nursery W. of Gulf (Sheridan) (06114-48173)	April 18
8	7	Gulf Parking Lot (06119-48166)	April 19
9	2	Lakeshore & Southdown Rds (06122-48167)	April 20
10	2	Lakeshore & Southdown Rds (06122-48167)	April 21
11	2	Lakeshore & Southdown Rds (06122-48167)	April 21

TABLE # 4

HI-VOLUME SAMPLING SITES

MISSISSAUGA II SURVEY - 1978

<u>Filter #</u>	<u>Map I.D.</u>	<u>Location and U.T.M. Co-ordinates</u>	<u>Date 1978</u>
41000001	2	Southdown & Lakeshore Rds (06122-48167)	April 11
41000003	3	Meadow Wood Park (06125-48182)	April 12
41000007	4	Park at end of Apple Lane (06128-48177)	April 16
41000009	7	Gulf Parking Lot (06119-48166)	April 19
41000010	2	Southdown & Lakeshore Rds (06122-48167)	April 20
41000011	2	Southdown & Lakeshore Rds (06122-48167)	April 21

07. RESULTS

Definition of Terms

Scan Time:	Frequency of interrogation of the monitoring instrumentation by the data acquisition system.
Time:	Time of the first and final scans used to determine running averages.
Number of Readings:	Number of scans
MAM:	Mobile Air Monitoring
glc:	ground level concentration

All statistical values are based on cumulative averages of continuous instantaneous interrogations of the monitoring instruments and all results are expressed in parts per million (ppm). Due to the large quantity of data, time averages will be included in the addendum entitled "Ambient Air Survey in the Mississauga Area, April 1978, Compilation of Time Averaged Data", which will accompany this report and will be presented upon request. Both 30 and 60 minute averages of the data will be presented in this addendum.

The statistical summary of the collected data is presented in Tables #5 to #13, pages 36 to 44. Supplementing these tables, concentration versus time graphs are presented in Figures #1 to #9, pages 24 to 32.

In order to assist in source identification, wind rose/concentration analyses were plotted (see Maps #3 to #5, pages 33 to 35).

08. DISCUSSION

A high pressure ridge dominated the weather in southern Ontario during the weekend of April 9th. By the beginning of the survey, Monday April 10th, edge effects of a low pressure system were being experienced in the Mississauga area. During Wednesday night, April 12, a second cold front pushed through the area bringing thunderstorms and showers. From Thursday, April 13 to Sunday, April 23, the weather in southern Ontario was dominated by a high pressure system. The winds were generally westerly and light, and good atmospheric dispersion conditions existed. Many periods with fair weather cumulus clouds were noted as well as the lake breeze phenomenon (from Lake Ontario) on several occasions.

The pollutants of interest in the vicinity of Tricil and the Gulf refinery were sulphur dioxide, oxides of nitrogen, hydrogen sulphide and total hydrocarbons. Monitoring of these contaminants was carried out for approximately 285 hours during the survey. The following are the criteria for the contaminants which will be discussed in this section. These desirable ambient air quality criteria are based on a 60-minute average concentration of gaseous contaminants as set out in Schedule 1, of the 1971 Ontario Environmental Protection Act, O. Reg. 872/74.

<u>Contaminant</u>	<u>Criterion*</u>
Sulphur Dioxide - SO ₂	0.25 ppm
Oxides of Nitrogen - NO _x	0.20 ppm **
Hydrogen Sulphide - H ₂ S	0.02 ppm ***
Total Hydrocarbons - THC	****

* Conversion from $\mu\text{g}/\text{m}^3$ to ppm was made under the following conditions; temperature: 298°K (25°C), atmospheric pressure: 101.6 kPa.

** Expressed as concentrations of nitrogen dioxide. (Nitric oxide (NO) in the presence of ozone (O₃) readily forms nitrogen dioxide (NO₂). Long time integrated samples (usually 24 hours), when analyzed, contain little or no NO because of this conversion feature. Our analyzer distinguishes between NO and NO₂ and collectively denotes them as nitrogen oxides (NO_x). Therefore,

since our ambient air sampling and analysis is fast (few seconds) and in order to conform to the criteria, NO_x has to be equated to the NO_2 concentration levels.)

*** The H_2S analyzers were also sensitive to mercaptans and other malodorous sulphur compounds containing the HS^- group.

**** At this time there exists no standard nor criterion for total hydrocarbons.

Also included in this discussion are the results of the Hi-Volume analysis. The samples collected were analyzed for total suspended particulate, sulphates, total and free carbon.

The results of the hydrocarbon analysis by the GC is also presented in this section. The hydrocarbons discussed are: methane, ethane, ethene, acetylene, propane and propene, cyclopropane, vinyl chloride monomer, n-butane, n-pentane, and n-hexane.

Sulphur Dioxide

The overall average glc for SO_2 was 0.023 ppm with an associated standard deviation of 0.052 ppm.

However, from the 285 hours that SO_2 was monitored during this survey, 3.5 of these hours (approximately 1%), recorded glc's in excess of the criterion for the hourly average concentration (0.25 ppm). (See statistical summary Table #5, page 36.) The largest one-hour average glc of SO_2 recorded was 2.05 ppm (approximately 8 times the criterion). This was acquired on April 23, during monitoring period Mississauga II #15 (see Figure #1, page 24). During this period, the MAM unit was located at the intersection of Southdown and Lakeshore Roads, and the winds were from the NNW at approximately 5 km/hr. A wind rose/concentration analysis was performed for this monitoring period and the results clearly suggested that Gulf was a possible source of this contaminant. (See Map #3, page 33.)

Oxides of Nitrogen - NO_x

Other important gaseous pollutants monitored were the oxides of nitrogen which include nitric oxide (NO) and nitrogen dioxide (NO₂). The criterion for this group is expressed as concentrations of NO₂ (see section 08 page 16 for an explanation).

Generally low levels of NO_x were found in the Mississauga area. The overall average glc and associated standard deviation were 0.030 ppm and 0.029 ppm respectively. For the summary of statistical results for NO_x refer to Table #5, page 36.

The criterion for the hourly average concentration of NO_x (0.20 ppm) was exceeded on two separate occasions for approximately 6 hours (or 2% of the total time). The largest one-hour average glc recorded was 0.40 ppm -twice the criterion. This occurred on April 22, during monitoring period Mississauga II #15 (see Figure #1, page 24). During this time, the MAM unit was located at the intersection of Lakeshore and Southdown Roads and the winds were very light from the NW. The wind rose/concentration analysis for this period (see Map #4, page 34) does not clearly point to either Gulf or Tricil as the source. As noted by the concentration/time graphs (Figures #1 and #2, pages 24 and 25), the glc's of carbon monoxide and total hydrocarbons also increased. The statistics for this time showed that NO was the dominant component of NO_x (refer to Table #6, page 37). These factors plus the fact that the winds were light suggested that vehicular traffic was the most probable source of NO_x.

The glc's of NO_x also exceeded the criterion on April 16 (Mississauga II #7). The largest one-hour average glc during this period was 0.290 ppm. Winds were very calm from the SW and again the NO component was dominant which suggested that vehicular traffic was the source of the high NO_x glc's. (See Figures #3 and 4, pages 26 and 27.)

In general, background concentration levels of NO_x existed in this area.

Hydrogen Sulphide - H₂S

The analyzer used to measure the H₂S glc's was also sensitive to other reduced sulphur compounds. However, as dictated by the source emissions, H₂S was assumed to be the major gaseous component and the results were reported accordingly.

Concentrations of hydrogen sulphide were found to be, generally, low. The overall average glc and associated standard deviation were both 0.004 ppm. As noted by the statistical summary Table #8 , page 39 , the criterion for the hourly average concentration of H₂S (0.02 ppm) was exceeded on three separate occasions for approximately 1.5 hours or 0.5% of the total time (see Mississauga II #1,3 and 5; Figures #5 to 7, pages 28 to 30). The high initial concentrations were a result of allowing insufficient time to lapse between calibration and monitoring (a minimum of 30 minutes should be given to flush out the residual span gas from the system and allow the H₂S analyzer to stabilize). However, during monitoring period #5, (April 14), the remaining glc's recorded were relatively high (see Figure #7, page 30). The MAM unit at this time was located at the Ministry of the Environment sewage treatment plant. The wind rose/concentration analysis for this period (Map #5, page 35), does not clearly show Tricil as the source. It is possible that Tricil did contribute to the glc's of H₂S acquired; however, the high concentrations were assumed to originate from the sludge storage lagoons associated with and located near the sewage plant.

Total Hydrocarbons - THC

The concentration levels of THC were of interest in the vicinity of the Gulf refinery. The overall average glc was 2.16 ppm with an associated standard deviation 0.81 ppm.

As noted in the statistical summary of THC (Table #7, page 38), the largest one-hour average glc recorded was 12.7 ppm, recorded at the Sheridan tree

nursery, west of Gulf (Mississauga II #8, April 17). During this time, NO, NO_x and CO all had increased concentration levels. There was no wind and as a result of these factors, vehicular traffic was the suspected source. (See Figures #8 and 9, pages 31 and 32.)

The next highest concentration of THC recorded was 9.18 ppm and was acquired during monitoring period Mississauga II #7 on April 16. This value occurred at the same time the NO_x glc's exceeded their criterion. Thus, following the discussion presented in the NO_x section, vehicular traffic was the suspected source of these high glc's. (See Figures #3 and 4, pages 26 and 27.)

Hydrocarbon Analysis

Ambient air hydrocarbon concentration levels were studied using the gas chromatograph. The sampling locations and their results have been summarized in Table #12, on page 43. With respect to this summary table, a trace or an undetected result was assigned a concentration of ½ the lowest detection level which was 0.01 ppm.

The collected samples were analyzed for the hydrocarbons listed below. Also presented are the respective overall average and associated standard deviation in units of ppm.

<u>Hydrocarbon</u>		<u>Average</u> (ppm)	<u>Standard Deviation</u> (ppm)
methane	CH ₄	0.84	0.43
ethane	C ₂ H ₆	0.006	0.002
ethene	C ₂ H ₄	0.11	0.11
acetylene	C ₂ H ₂	0.018	0.024
propane & propene	C ₃ H ₈ & C ₃ H ₆	0.032	0.039
cyclopropane	C ₃ H ₆ (ring)	0.006	0.002
vinyl chloride monomer	C ₂ H ₃ Cl	0.038	0.078
n-butane	C ₄ H ₁₀	0.061	0.050
n-pentane	C ₅ H ₁₂	0.009	0.009
n-hexane	C ₆ H ₁₄	0.005	-

From these values, CH_4 , C_2H_4 and C_4H_{10} had the largest average concentrations. Also of interest was the sample taken at the Gulf parking lot on April 19th. The maximum concentrations of the components CH_4 , C_3H_8 & C_3H_6 , $\text{C}_2\text{H}_3\text{Cl}$, C_4H_{10} and C_5H_{12} were reported at this site. (These values were 1.18, 0.08, 0.24, 0.14, and 0.03 ppm respectively.) These elevated values could have been due to vehicular traffic associated with the parking lot; however, winds on this day were reported from the NE at approximately 20 km/hr which places this monitoring site downwind of the Gulf refinery.

In general it was found that the existing concentrations of hydrocarbons were at background concentration levels.

Hi-Volume Analysis

In order to establish ambient air mass loadings in the vicinity of Gulf and Tricil, a hi-volume sampler was set up on top of the MAM unit. The collection media used were glass-fibre filters which, after exposure, were analyzed for total suspended particulate matter (TSP), sulphates ($\text{SO}_4^{=}$), total carbon and free carbon mass loadings. The results may be found in Table #13, on page 44.

The detection limit for TSP was 1 ug/m^3 while for the remaining components, this value was 0.1 ug/m^3 . The information regarding wind speed and wind direction was obtained by the meteorological instrumentation associated with the MAM unit, (see Table #1, page 8), as well as information from the Atmospheric Environment Service.

The ambient air quality criterion for TSP (120 ug/m^3 - based on a 24-hour sampling period) was not exceeded during this survey. The average mass loading of TSP was 43 ug/m^3 with an associated standard deviation of 33 ug/m^3 . The maximum value obtained was 103 ug/m^3 at Meadow Wood Park, on April 12, during which time, the winds were from the WSW at approximately 15 km/hr. The monitoring site was therefore not directly downwind of the area under

investigation and as a result, no positive source identification could be made.

$\text{SO}_4^{=}$ constituted 21% of the TSP matter. The average mass loading was 9.2 ug/m^3 with an associated standard deviation 3.4 ug/m^3 . The maximum concentration was 13.0 ug/m^3 which occurred at the Gulf parking lot on April 19. The MAM unit was downwind of Gulf.

The average mass loading of total carbon was 7.3 ug/m^3 with an associated standard deviation of 3.2 ug/m^3 . The relative concentration of total carbon to TSP was 17%. The maximum concentration was 12.9 ug/m^3 recorded at Meadow Wood Park on April 12.

Free carbon represented 9% of the TSP mass loading. The average concentration and standard deviation were 3.8 ug/m^3 and 1.3 ug/m^3 respectively. The maximum loading was 5.5 ug/m^3 which was also recorded at Meadow Park on April 12.

09. APPENDIX

a) Figures:

- #1 NO_x, SO₂ and CO concentration/time analysis for Mississauga II #15
- #2 NO, THC and O₃ concentration/time analysis for Mississauga II #15
- #3 NO_x, SO₂ and CO concentration/time analysis for Mississauga II #7
- #4 NO, THC and O₃ concentration/time analysis for Mississauga II #7
- #5 NO_x, SO₂ and H₂S concentration/time analysis for Mississauga II #1
- #6 NO_x, SO₂ and H₂S concentration/time analysis for Mississauga II #3
- #7 NO_x, SO₂ and H₂S concentration/time analysis for Mississauga II #5
- #8 NO, T^HAC and O₃ concentration/time analysis for Mississauga II #8
- #9 NO_x, SO₂ and CO concentration/time analysis for Mississauga II #8

b) Maps:

- #3 SO₂ wind rose/concentration analysis for Mississauga II #15
- #4 NO_x wind rose/concentration analysis for Mississauga II #15
- #5 H₂S wind rose/concentration analysis for Mississauga II #5

c) Tables:

- #5 SO₂ and NO_x 60-minute averaged statistics
- #6 NO and O₃ 60-minute averaged statistics
- #7 THC and CO 60-minute averaged statistics
- #8 H₂S 60-minute averaged statistics
- #9 SO₂ and NO_x 30-minute averaged statistics
- #10 H₂S and O₃ 30-minute averaged statistics
- #11 CO and THC 30-minute averaged statistics
- #12 Hydrocarbon Analysis
- #13 Hi-Volume Analysis

MISSISSAUGA 11 #15

18:35 APR 22 1978 SCAN= 90 SEC AVE= 60 MIN
LAKE SHORE ON SOUTHDOWN RD. (25122-48167); 0.4KM & 2050GS/SOURCE-SULF

0.001	0.000	0.000	0.003	0.076	0.078	SRAD	W/CM2
10	6	3	2	8	13	TEMP	DEG C
22	25	40	45	46	27	HUM	% REL
1012	1012	1013	1014	1013	1010	PRES	MBAR

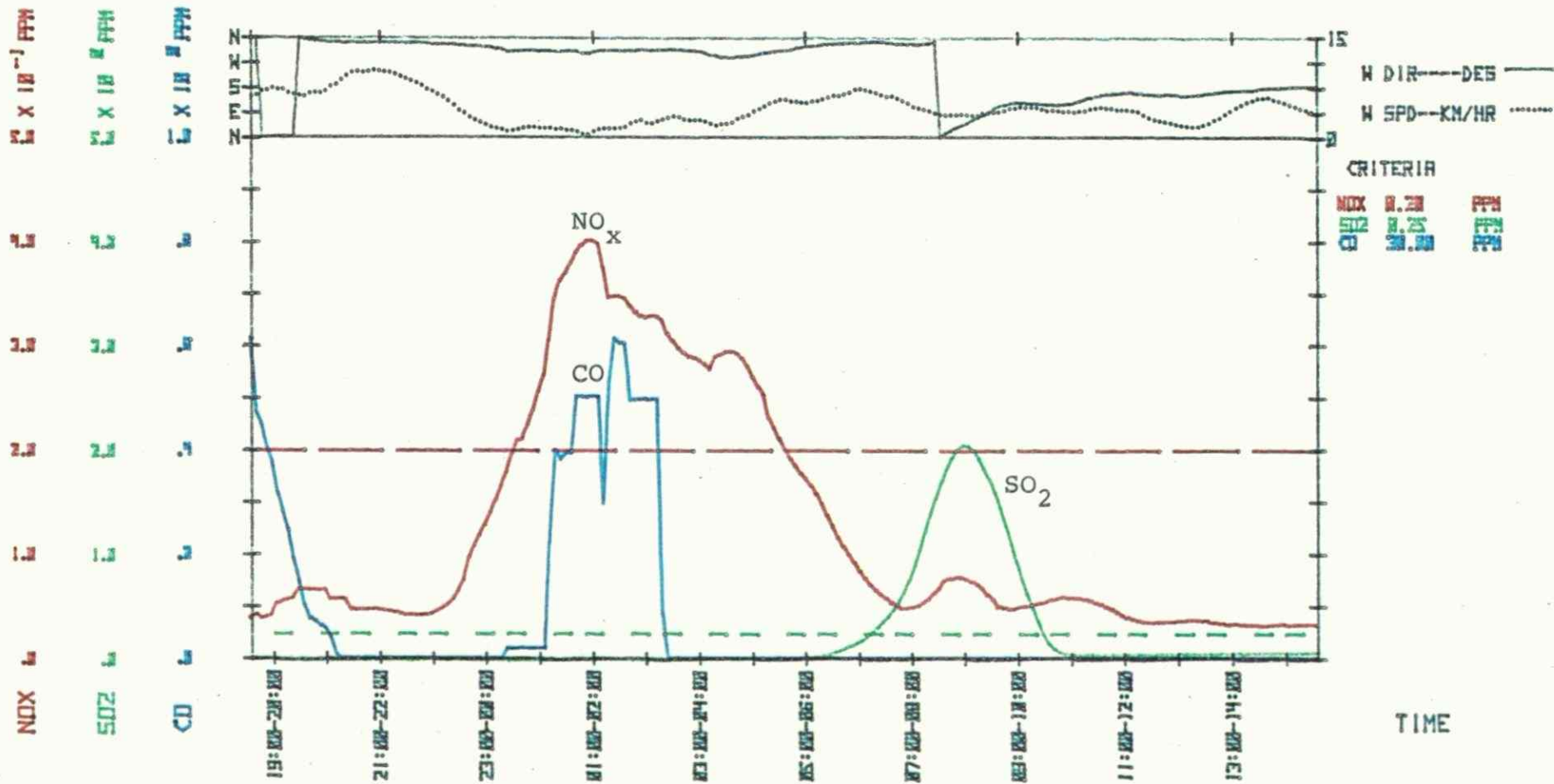


Figure #1

MISSISSAUGA 11 #15

18:35 APR 22 1978 SCAN= 90 SEC AVE= 60 MIN
LAKE SHORE ON SOUTHDOWN RD. (26122-48167); 0.4KM & 285DEG/SOURCE-GULF

0.001	0.000	0.000	0.003	0.076	0.078	SRAD	W/CM2
10	6	3	2	8	13	TEMP	DEG C
22	25	40	45	46	27	HUM	% REL
1012	1012	1013	1014	1013	1010	PRES	MBAR

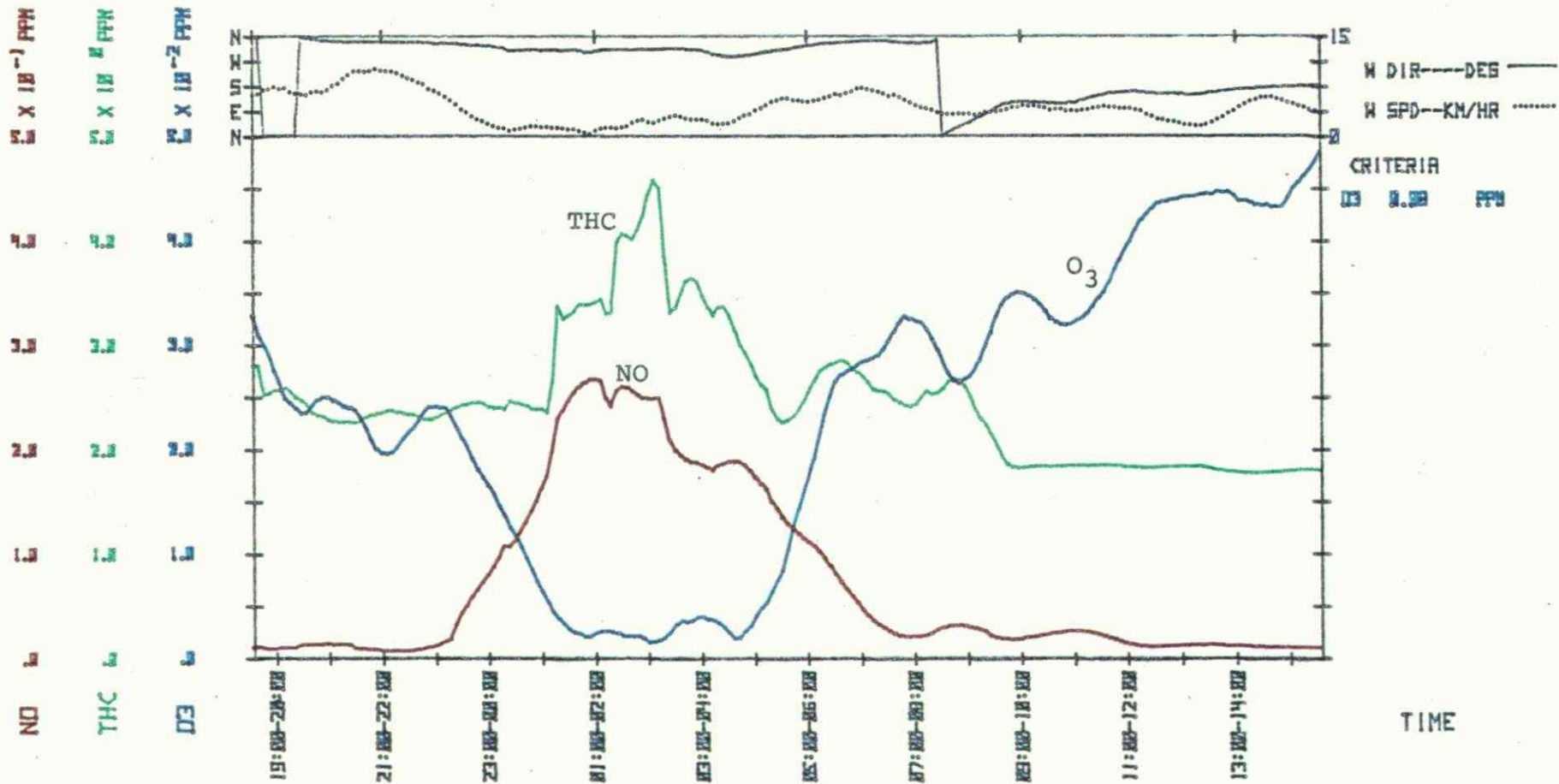


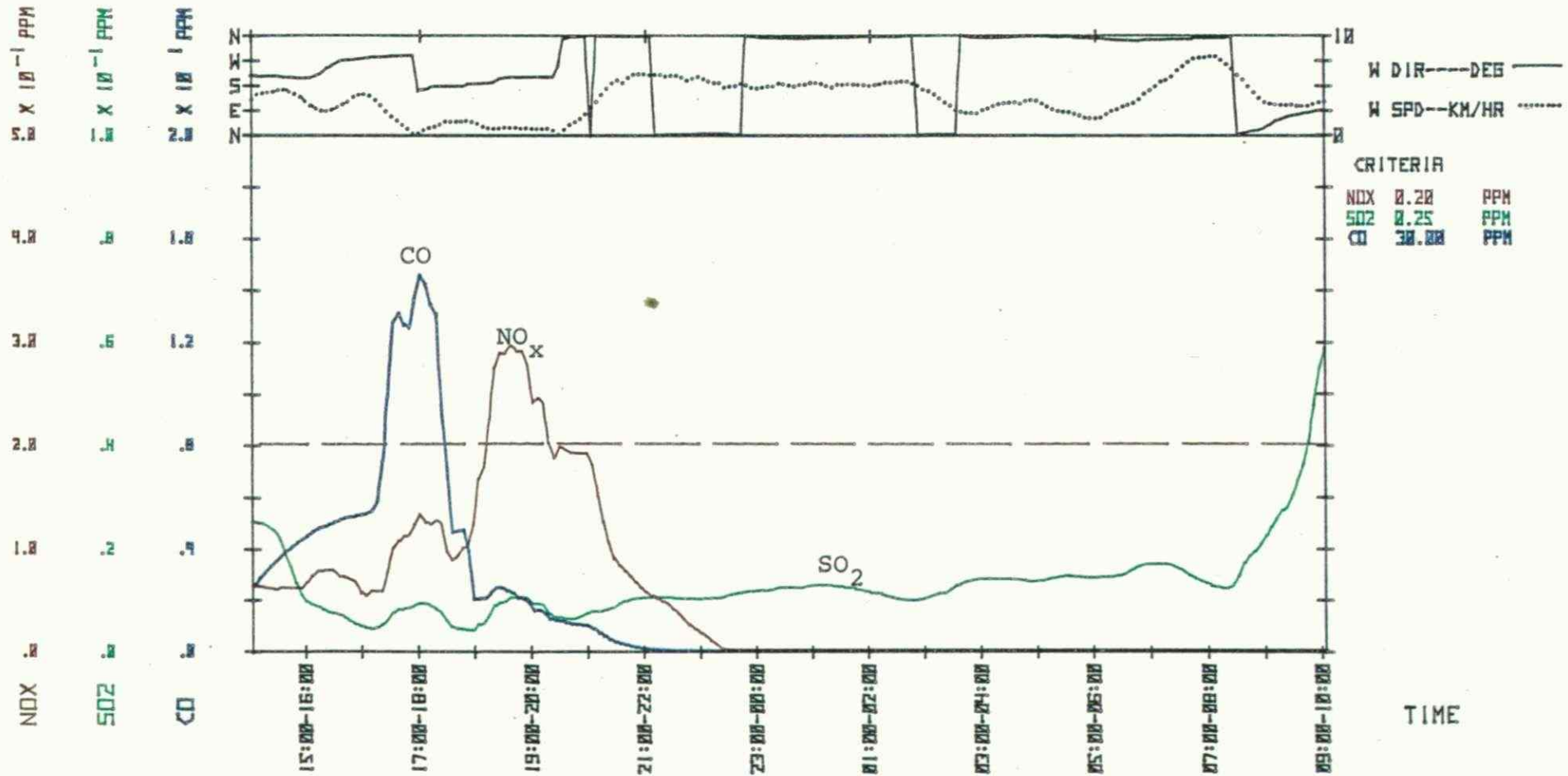
Figure #2

MISSISSAUGA 11 #7

14:04 APR 16 1978 SCAN= 300 SEC AVE= 60 MIN
PARK AT END OF APPLE LANE (06128-48177); 0.7KM & 040065/SOURCE-GULF

0.009	0.003	0.000	0.000	0.001
9	10	6	4	-1
46	43	42	47	100
1014	1013	1013	1013	1014

SRAD	W/CM2
TEMP	DEG C
HUM	% REL
PRES	MBAR



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Figure #3

MISSISSAUGA 11 #7

14:04 APR 16 1978 SCAN= 300 SEC AVE= 60 MIN
 PARK AT END OF APPLE LANE (06128-48177); 0.7KM & 040DEG/SOURCE-GULF

0.005
 9
 46
 1014

0.003
 10
 43
 1013

0.000
 6
 42
 1013

0.000
 4
 47
 1013

0.001
 -1
 100
 1014

SRAD W/CM2
 TEMP DEG C
 HUM % REL
 PRES MBAR

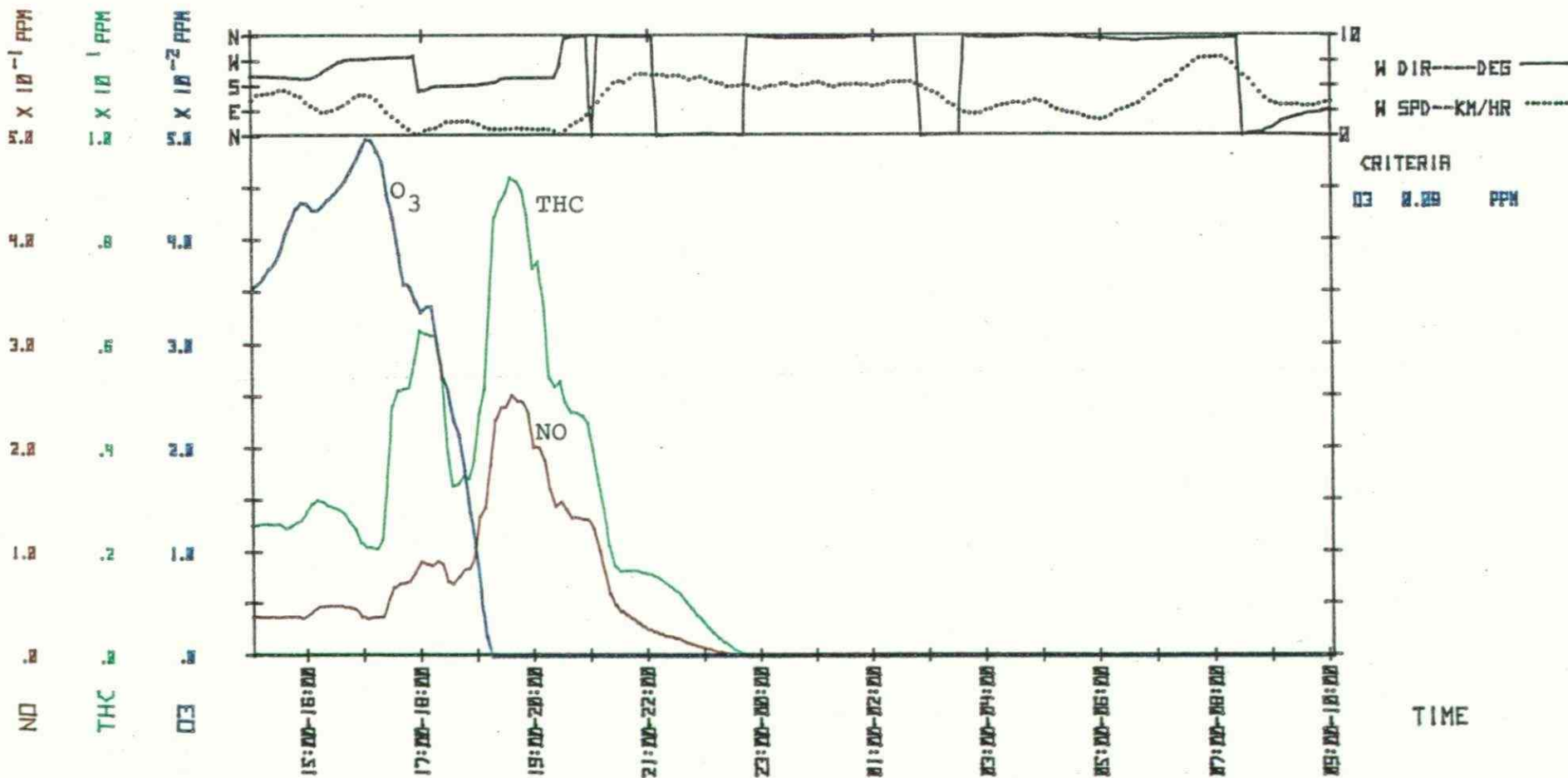


Figure #4

MISSISSAUGA 11 #1

15:00 APR 10 1978

SCAN= 90 SEC AVE= 60 MIN

AVONHEAD RD., 250M SW TRICIL(06109-48169); 1.5KM & 260065/SOURCE-GULF

0.030	0.000	0.000	0.000	0.000	0.005	SRAD	W/CM2
6	4	4	3	3	4	TEMP	DEG C
77	80	86	100	100	100	HUM	% REL
998	996	995	992	988	985	PRES	MBAR

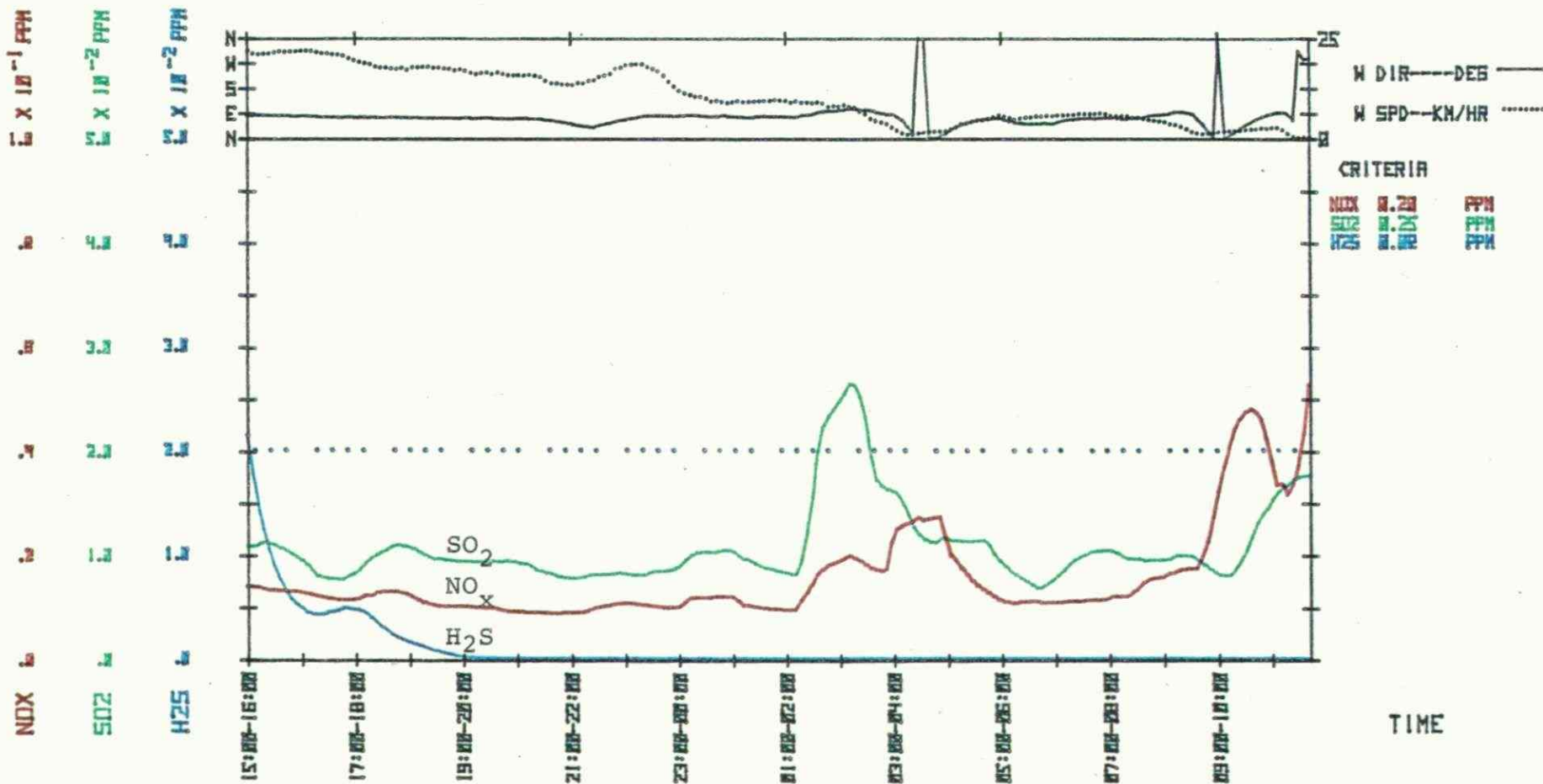


Figure #5

MISSISSAUGA 11 #3

14:26 APR 12 1978

SCAN= 600 SEC AVE= 60 MIN

MEADOW WOOD PK. (06125-40182); 0.9KM & 005065/SOURCE-GULF

0.041
12
54
993

0.019
17
37
991

0.000
16
44
991

0.000
13
77
991

0.000
10
72
992

0.061
13
39
993

SRAD W/CH2
TEMP DEG C
HUM % REL
PRES MBAR

NOX X 10⁻¹ PPM
SO2 X 10⁻² PPM
H2S X 10⁻² PPM

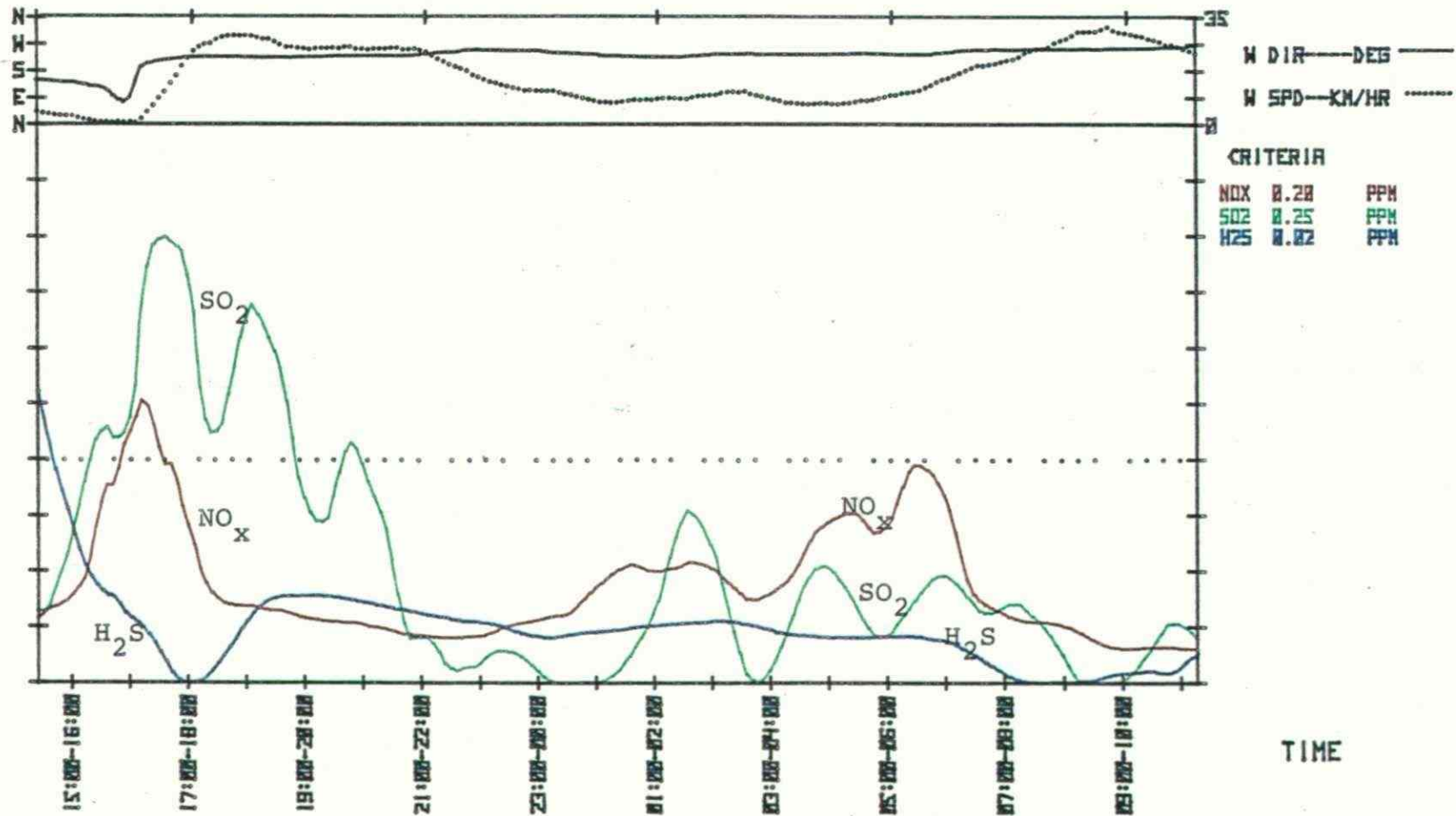


Figure #6

MISSISSAUGA 11 #5

13:28 APR 14 1978 SCAN= 300 SEC AVE= 60 MIN
M.O.E. SEWAGE PLT.(06117-40162); 1.0KM & 152065/SOURCE-TRICIL

0.031	0.007	0.000	0.000	0.000	0.028	0.022	SRAD	W/CM2
8	7	6	3	3	6	8	TEMP	DEG C
35	39	40	54	63	42	41	HUM	% REL
1000	1009	1010	1010	1009	1010	1009	PRES	MBAR

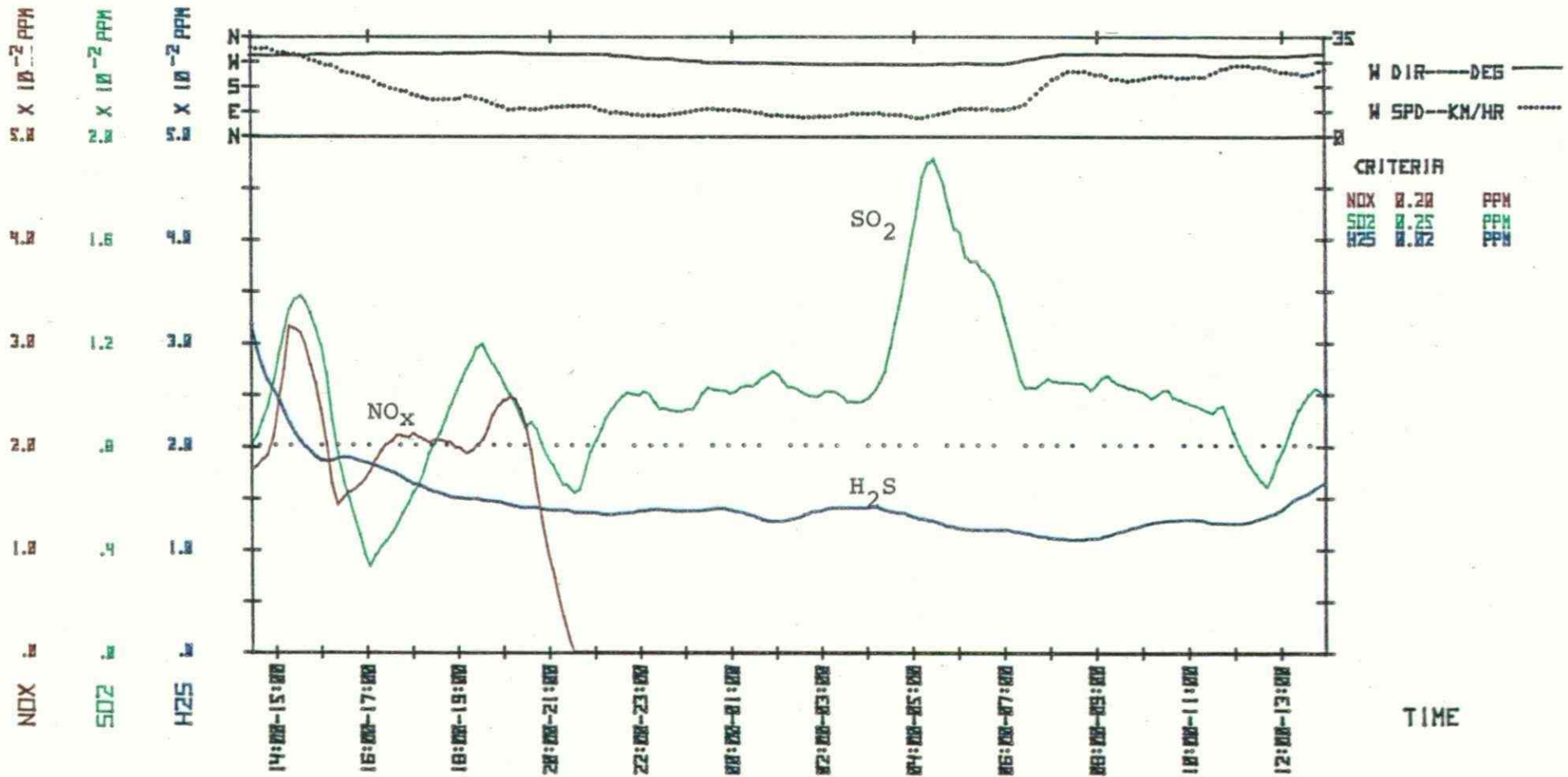
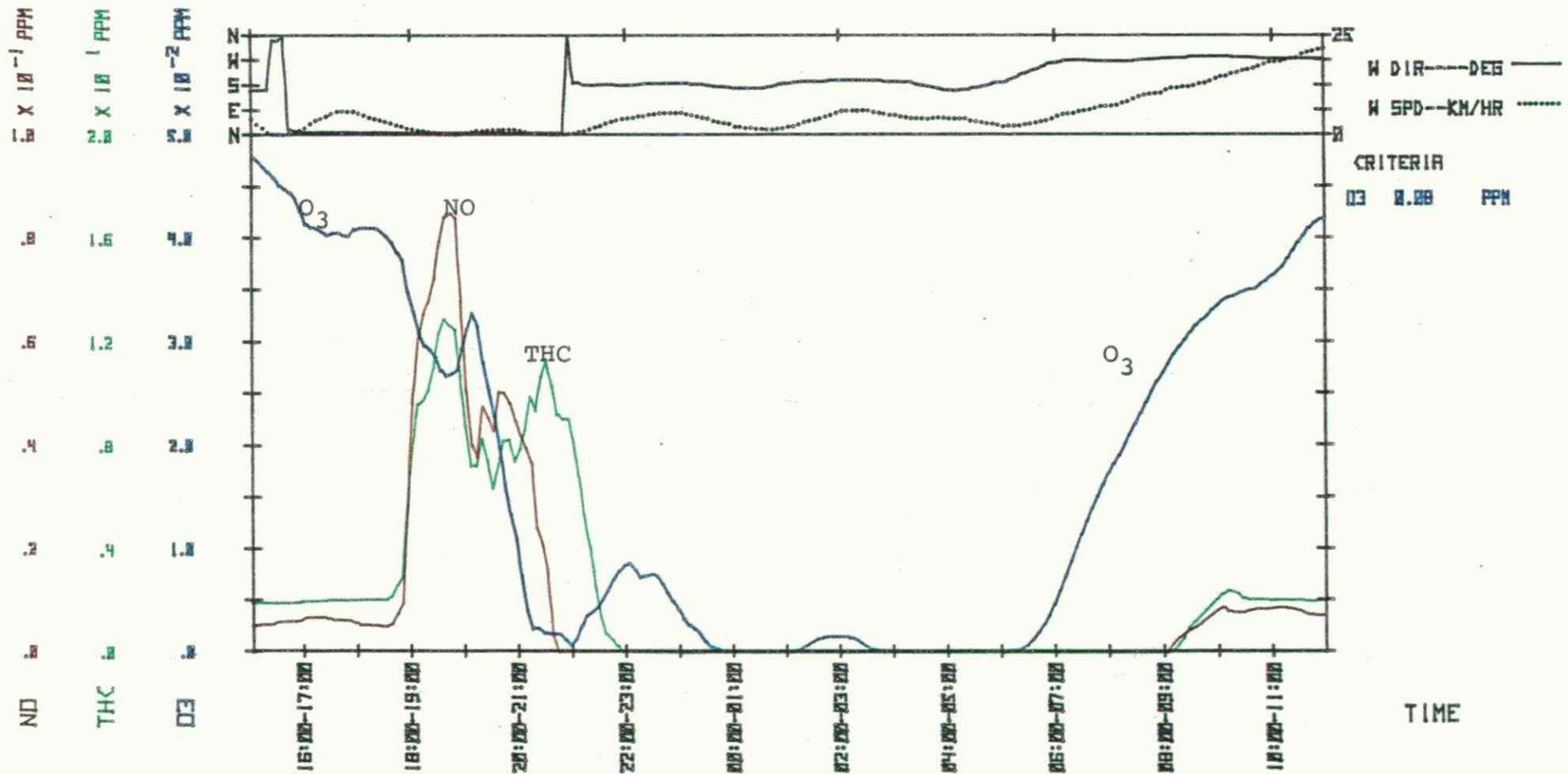


Figure #7

MISSISSAUGA 11 #8

15:04 APR 17 1978 SCAN= 150 SEC AVE= 60 MIN
 TREE NURSERY WEST OF GULF (06114-40173); 0.9KM & 275DEG/SOURCE-GULF

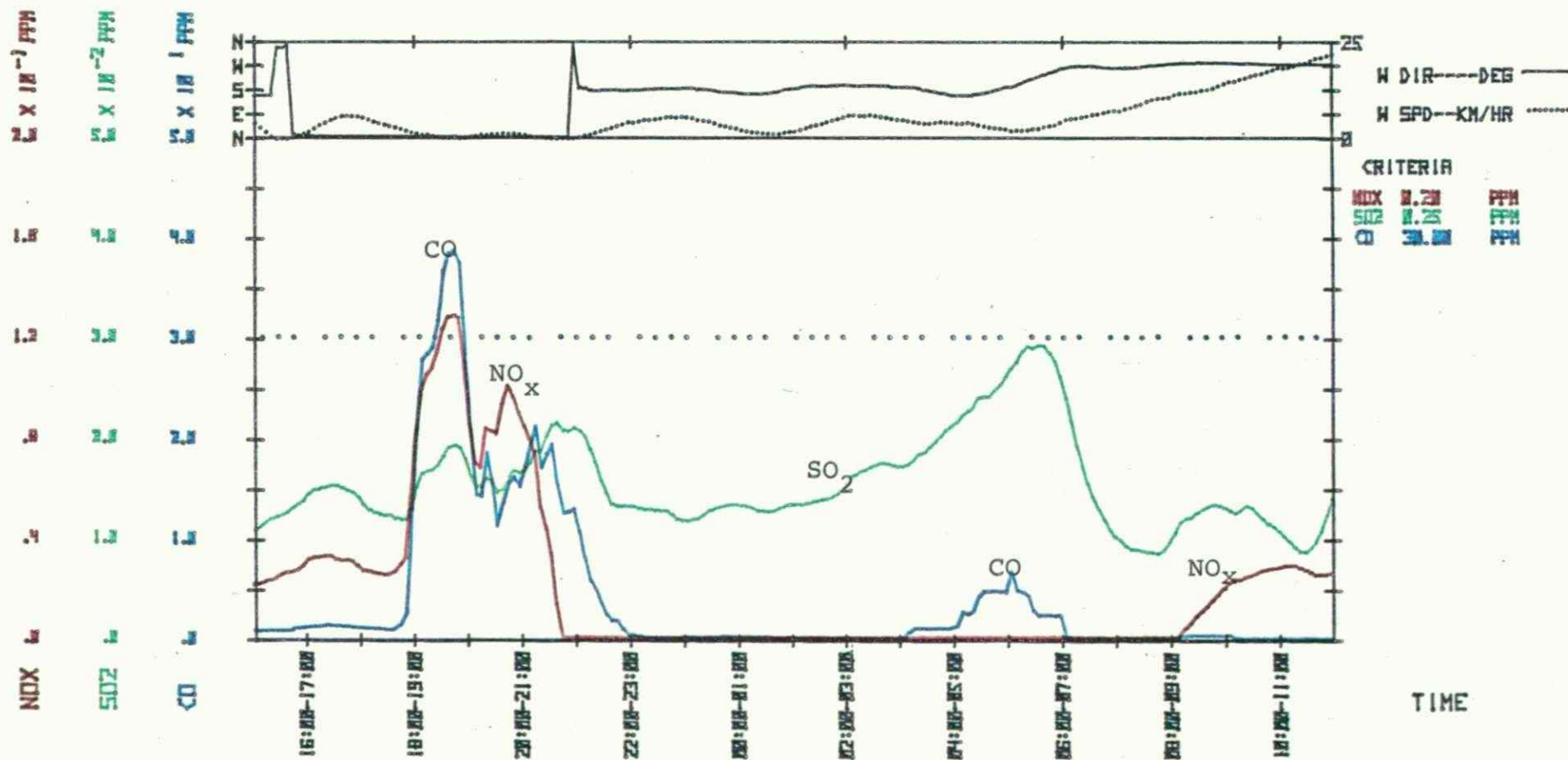
0.056	0.006	0.000	0.000	0.011	0.064	SRAD	W/CMZ
14	9	4	1	4	9	TEMP	DEG C
29	39	63	73	85	70	HUM	% REL
1011	1010	1012	1010	1010	1000	PRES	MBAR



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 Figure #8

15:04 APR 17 1978 SCAN= 150 SEC AVE= 60 MIN
TREE NURSERY WEST OF GULF (06114-40173); 0.9KM & 275 DGS/SOURCE-GULF

0.056	0.006	0.000	0.000	0.011	0.064	SRAD	W/CH2
14	9	4	1	4	9	TEMP	DEG C
29	39	63	73	85	70	HUM	% REL
1011	1010	1012	1010	1010	1000	PRES	MBAR



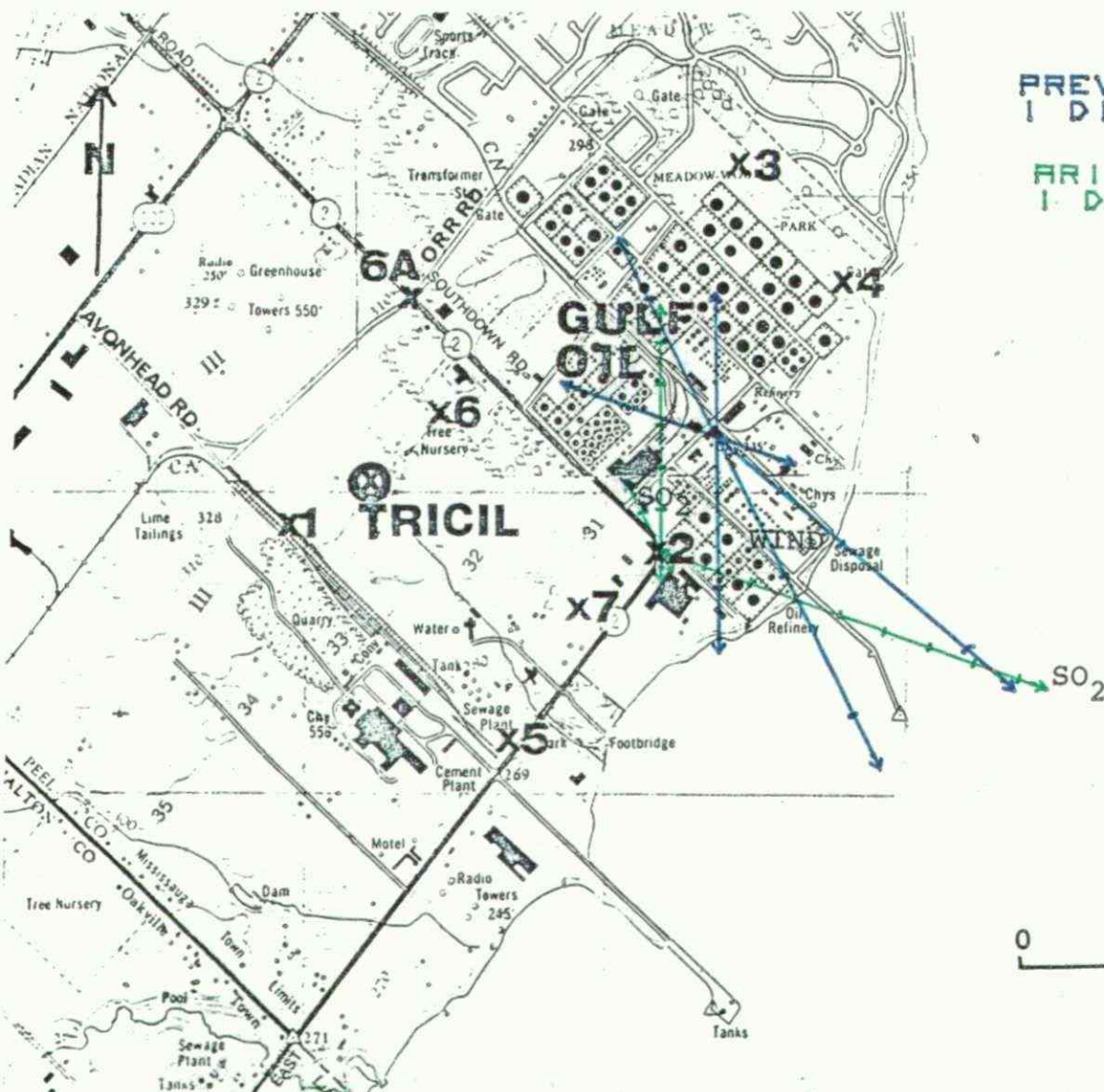
MISSISSAUGA 11 #15

18:35 APR 22 1978
 LENGTH= 21 HRS
 DELAY= 0 MIN
 LOC: LAKE SHORE ON SOUTHDOWN RD. (06122-48167); 0.4KM & 20SDGS/SOURCE-GULF

SCAN= 90 SEC AVE= 60 MIN
 MINIMUM MEAN= 1.00000E-03 PPM
 WIND RANGE= 0 / 15 KM/HR

PREVAILING WINDS; BLOWING TOWARDS:
 1 DIV= 10 %

ARITHMETIC MEAN: SO₂
 1 DIV= 0.1 PPM



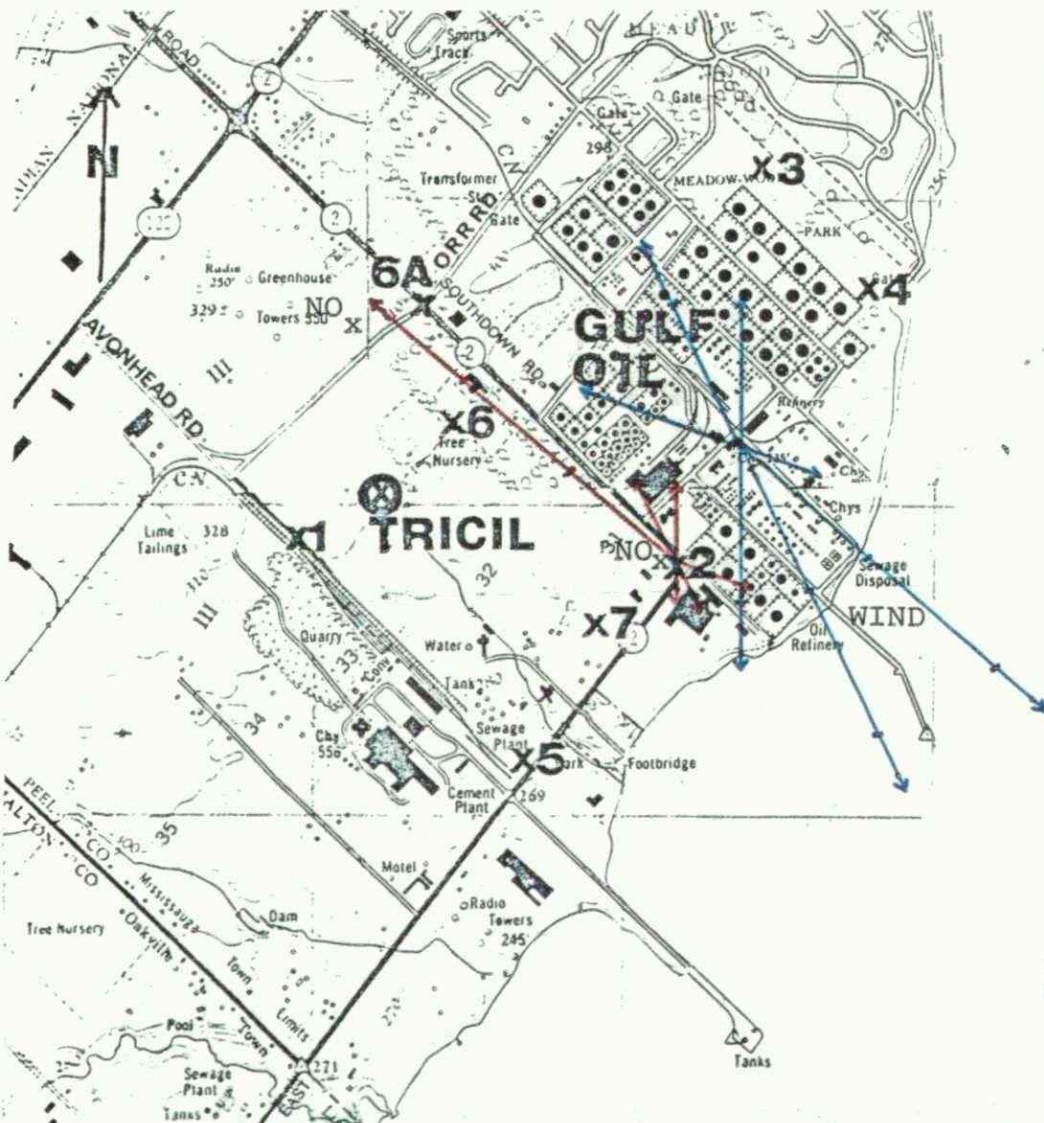
MISSISSAUGA 11 #15

18:35 APR 22 1978
 LENGTH= 21 HRS
 DELAY= 0 MIN
 LOC: LAKE SHORE ON SOUTHDOWN RD. (06122-48167); 0.4KM & 205DGS/SOURCE-GULF

SCAN= 90 SEC AVE= 60 MIN
 MINIMUM MEAN= 0.01 PPM
 WIND RANGE= 0 / 15 KM/HR

PREVAILING WINDS; BLOWING TOWARDS:
 1 DIV= 10

ARITHMETIC MEAN; NOX
 NDW= 0.1 PPM



MISSISSAUGA 11 #5

13:28 APR 14 1978
LENGTH= 24.5 HRS
DELAY= 0 MIN
LOC: M.O.E. SEWAGE PL

SCAN= 300 SEC AVE= 60 MIN
MINIMUM MEAN= 1.00000E-03 PPM
WIND RANGE= 0 / 45 KM/HR
-481620; 1.0KM & 150DGS/SOURCE-TRICIL

PREVAILING WINDS; BLOWING TOWARDS:
1 DIV= 10 %

ARITHMETIC MEAN: H2S
1 DIV= 0.01 PPM

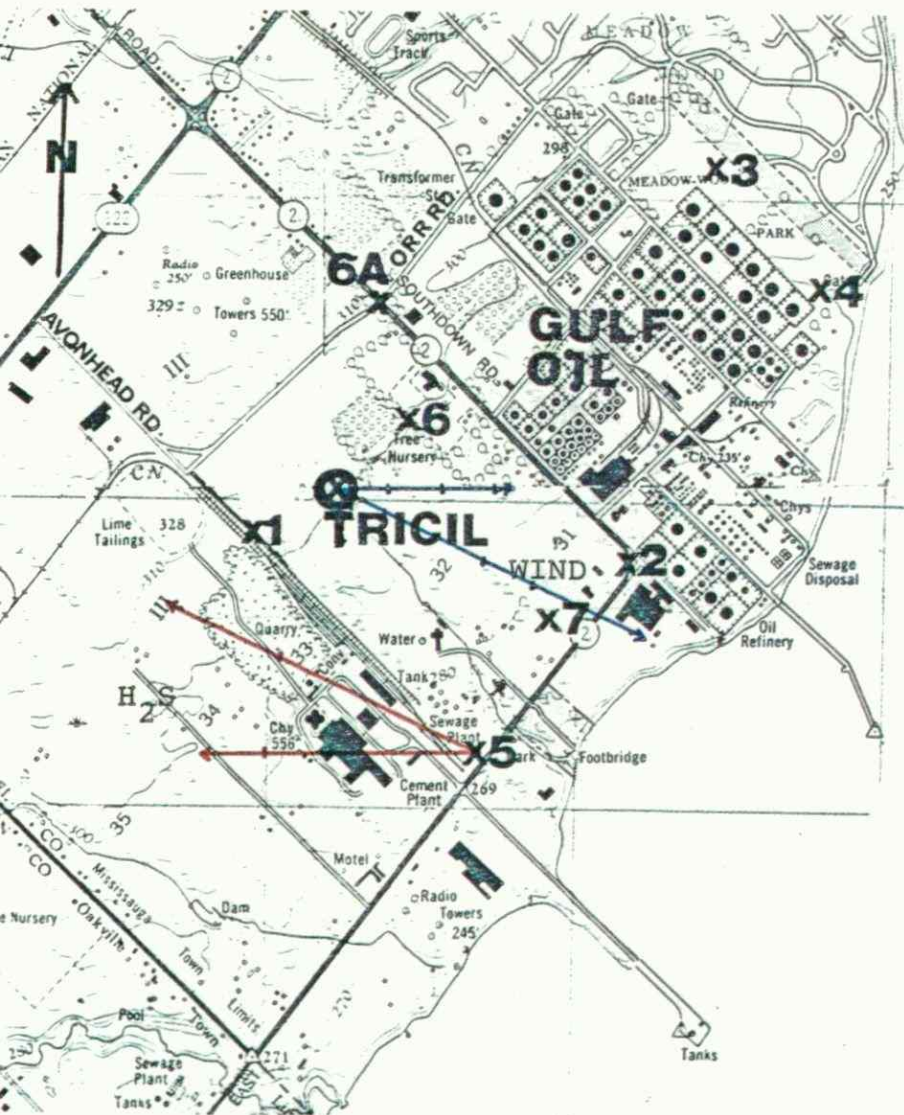


TABLE # 5

AMBIENT AIR SURVEY IN MISSISSAUGA

Units - PPM

GROUND LEVEL CONCENTRATIONS IN THE VICINITY OF GULF and TRICIL

MONITORING LOCATION / NUMBER	DATE APRIL 1978	MONITORING TIME START / END	INSTANTANEOUS CONCENTRATION				MAXIMUM 60-MINUTE AVERAGE CONCENTRATION		MONITORING PERIOD AVERAGE CONCENTRATION		SCAN TIME
			SO ₂		NO _x		SO ₂	NO _x	SO ₂	NO _x	
MISSISSAUGA II #1	10	15:00-11:30	0.005	0.061	0.008	0.128	0.027	0.048	0.011	0.017	1.5
" #2	11	13:07-09:37	0.001	0.023	0.001	0.026	0.015	0.022	0.003	0.005	10
" #3	12	14:26-11:16	0.001	0.039	0.010	0.128	0.016	0.103	0.004	0.034	10
" #4	13	13:09-11:19	0.001	0.004	0.007	0.027	0.001	0.024	0.001	0.015	10
" #5	14-15	13:28-13:58	0.001	0.025	0.001	0.053	0.019	0.032	0.010	0.006	5
" #6	15	14:48-11:48	0.001	0.017	0.001	0.095	0.015	0.076	0.007	0.035	5
" #7	16	14:04-10:04	0.002	0.106	0.001	0.819	0.059	0.290	0.015	0.048	5
" #8	17	15:04-11:49	0.005	0.037	0.001	0.353	0.029	0.128	0.015	0.019	2.5
" #9	18	12:10-20:50	0.001	0.031	0.004	0.036	0.019	0.027	0.009	0.015	2.5
" #10	18	21:05-09:35	0.001	0.021	0.005	0.041	0.015	0.015	0.007	0.011	2.5
" #11	19	12:50:14:30	0.008	0.015	0.015	0.024	0.013	0.021	0.011	0.020	2.5
" #12	19	14:34-11:04	0.006	0.060	0.009	0.059	0.048	0.041	0.016	0.023	2.5
" #13	20	13:26-10:11	0.001	0.018	0.009	0.153	0.013	0.061	0.008	0.034	2.5
" #14	21-22	13:30-18:00	0.002	0.028	0.014	0.368	0.019	0.148	0.011	0.046	2.5
" #15	22	18:35-15:35	0.001	2.24	0.023	0.930	2.05	0.400	0.209	0.122	1.5

TABLE # 6

AMBIENT AIR SURVEY IN MISSISSAUGA

Units - PPM

GROUND LEVEL CONCENTRATIONS IN THE VICINITY OF GULF and TRICIL

MONITORING LOCATION / NUMBER	DATE April 1978	MONITORING TIME START / END	INSTANTANEOUS CONCENTRATION				MAXIMUM 60-MINUTE AVERAGE CONCENTRATION		MONITORING PERIOD AVERAGE CONCENTRATION		SCAN TIME Min.
			NO		O ₃		NO	O ₃	NO	O ₃	
			Min.	Max.	Min.	Max.					
MISSISSAUGA II #1	10	15:00-11:30	0.001	0.077	0.002	0.042	0.016	0.041	0.004	0.033	1.5
" #2	11	13:07-09:37	0.001	0.007	0.013	0.039	0.005	0.037	0.001	0.030	10
" #3	12	14:26-11:16	0.002	0.091	0.001	0.053	0.059	0.051	0.012	0.034	10
" #4	13	13:09-11:19	0.001	0.007	0.018	0.038	0.004	0.038	0.002	0.028	10
" #5	14-15	13:28-13:58	0.001	0.023	0.007	0.038	0.013	0.037	0.002	0.028	5
" #6	15	14:48-11:48	0.001	0.161	0.001	0.034	0.045	0.031	0.014	0.018	5
" #7	16	14:04-10:04	0.001	0.702	0.001	0.052	0.245	0.050	0.034	0.008	5
" #8	17	15:04-11:49	0.001	0.279	0.001	0.050	0.085	0.048	0.009	0.018	2.5
" #9	18	12:10-20:50	0.001	0.009	0.040	0.057	0.007	0.055	0.003	0.049	2.5
" #10	18	21:05-09:35	0.001	0.009	0.033	0.049	0.002	0.048	0.001	0.042	2.5
" #11	19	12:50-14:30	0.004	0.007	0.039	0.045	0.005	0.043	0.005	0.043	2.5
" #12	19	14:34-11:04	0.001	0.015	0.007	0.047	0.009	0.046	0.005	0.033	2.5
" #13	20	13:26-10:11	0.001	0.067	0.009	0.038	0.023	0.037	0.009	0.027	2.5
" #14	21-22	13:30-18:00	0.001	0.313	0.001	0.056	0.079	0.054	0.021	0.033	2.5
" #15	22	18:35-15:35	0.001	0.776	0.001	0.053	0.267	0.048	0.070	0.025	1.5

TABLE # 7AMBIENT AIR SURVEY IN MISSISSAUGA

Units - PPM

GROUND LEVEL CONCENTRATIONS IN THE VICINITY OF GULF and TRICIL

MONITORING LOCATION / NUMBER	DATE April 1978	MONITORING TIME START / END	INSTANTANEOUS CONCENTRATION				MAXIMUM 60-MINUTE AVERAGE CONCENTRATION		MONITORING PERIOD AVERAGE CONCENTRATION		SCAN TIME
			THC		CO		THC	CO	THC	CO	Min.
			Min.	Max.	Min.	Max.					
MISSISSAUGA II #1	10	15:00-11:30	1.75	12.5	0.642	59.3	3.11	5.89	2.47	2.96	1.5
" #2	11	13:07-09:37	0.001	2.13	0.001	13.0	1.93	12.6	0.553	6.42	10
" #3	12	14:26-11:16	1.53	10.9	0.001	0.700	8.17	0.575	3.76	0.090	10
" #4	13	13:09-11:19	1.50	3.28	0.001	10.3	2.81	8.40	2.28	4.05	10
" #5	14-15	13:28-13:58	0.001	6.96	0.001	18.2	4.18	7.69	0.637	0.398	5
" #6	15	14:48-11:48	0.001	3.28	0.001	1.76	2.42	0.970	1.87	0.120	5
" #7	16	14:04-10:04	0.001	26.7	0.001	43.0	9.18	14.4	1.60	1.57	5
" #8	17	15:04-11:49	0.001	32.3	0.001	106	12.7	38.6	2.14	3.87	2.5
" #9	18	12:10-20:50	1.74	5.19	0.001	1.82	2.86	0.466	2.14	0.080	2.5
" #10	18	21:05-09:35	1.78	14.5	0.001	3.87	4.18	1.06	2.60	0.173	2.5
" #11	19	12:50-14:30	2.04	5.39	0.185	2.62	3.32	1.31	3.04	1.06	2.5
" #12	19	14:34-11:04	1.68	4.34	0.001	5.09	2.58	1.68	2.18	0.261	2.5
" #13	20	13:26-10:11	1.77	5.12	0.001	16.7	3.12	13.5	2.26	7.42	2.5
" #14	21-22	13:30-18:00	1.84	9.17	0.001	34.5	2.96	2.81	2.41	1.16	2.5
" #15	22	18:35-15:35	1.75	32.2	0.001	16.4	4.54	0.615	2.47	0.083	1.5

TABLE # 8

AMBIENT AIR SURVEY IN MISSISSAUGA

Units - PPM

GROUND LEVEL CONCENTRATIONS IN THE VICINITY OF GULF & TRICIL

MONITORING LOCATION / NUMBER	DATE April 1978	MONITORING TIME START / END	INSTANTANEOUS CONCENTRATION H ₂ S				MAXIMUM 60-MINUTE AVERAGE CONCENTRATION		MONITORING PERIOD AVERAGE CONCENTRATION		SCAN TIME
			Min.	Max.	Min.	Max.	H ₂ S		H ₂ S		Min.
MISSISSAUGA II #1	10	15:00-11:30	0.001	0.047			0.021		0.002		1.5
" #2	11	13:07-09:37	0.001	0.009			0.007		0.001		10
" #3	12	14:26-11:16	0.001	0.038			0.026		0.005		10
" #4	13	13:09-11:19	0.001	0.018			0.016		0.004		10
" #5	14-15	13:28-13:58	0.010	0.044			0.032		0.015		5
" #6	15	14:48-11:48	0.001	0.012			0.007		0.001		5
" #7	16	14:04-10:04	0.001	0.021			0.010		0.001		5
" #8	17	15:04-11:49	0.001	0.020			0.016		0.004		2.5
" #9	18	12:10-20:50	0.001	0.016			0.011		0.004		2.5
" #10	18	21:05-09:35	0.001	0.004			0.003		0.001		2.5
" #11	19	12:50-14:30	0.007	0.014			0.012		0.011		2.5
" #12	19	14:34-11:04	0.001	0.008			0.007		0.004		2.5
" #13	20	13:26-10:11	0.001	0.013			0.010		0.002		2.5
" #14	21-22	13:30-18:00	0.001	0.013			0.011		0.005		2.5
" #15	22	18:35-15:35	0.001	0.040			0.009		0.001		1.5

TABLE # 9AMBIENT AIR SURVEY IN MISSISSAUGA

Units - PPM

GROUND LEVEL CONCENTRATIONS IN THE VICINITY OF GULF and TRICIL

MONITORING LOCATION / NUMBER	DATE APRIL 1978	MONITORING TIME START / END	INSTANTANEOUS CONCENTRATION				MAXIMUM 30-MINUTE AVERAGE CONCENTRATION		MONITORING PERIOD AVERAGE CONCENTRATION		SCAN TIME
			SO ₂		NO _x		SO ₂	NO _x	SO ₂	NO _x	
			Min.	Max.	Min.	Max.					Min.
MISSISSAUGA II #1	10	15:00-11:30	0.004	0.061	0.008	0.128	0.037	0.058	0.011	0.017	1.5
" #2	11	13:07-09:37	0.001	0.023	0.001	0.026	0.017	0.023	0.003	0.005	10
" #3	12	14:26-11:16	0.001	0.039	0.009	0.128	0.024	0.110	0.004	0.034	10
" #4	13	13:04-11:19	0.001	0.004	0.006	0.027	0.002	0.025	0.001	0.015	10
" #5	14 - 15	13:28-13:58	0.001	0.024	0.001	0.053	0.022	0.037	0.010	0.006	5
" #6	15	14:48-11:48	0.001	0.017	0.001	0.094	0.015	0.078	0.006	0.035	5
" #7	16	14:04-10:04	0.002	0.106	0.001	0.819	0.08	0.41	0.015	0.048	5
" #8	17	15:04-11:49	0.005	0.037	0.001	0.353	0.032	0.18	0.015	0.019	2.5
" #9	18	12:10-20:40	0.001	0.031	0.004	0.036	0.027	0.029	0.009	0.015	2.5
" #10	18	21:05-09:35	0.001	0.020	0.005	0.041	0.016	0.019	0.007	0.011	2.5
" #11	19	12:50-14:20	0.008	0.015	0.015	0.024	0.013	0.021	0.011	0.020	2.5
" #12	19	14:34-11:04	0.006	0.006	0.009	0.059	0.052	0.047	0.016	0.023	2.5
" #13	20	13:26-10:11	0.001	0.018	0.009	0.153	0.015	0.060	0.008	0.034	2.5
" #14	21 - 22	13:30-18:00	0.001	0.028	0.014	0.368	0.021	0.150	0.011	0.046	2.5
" #15	22	18:35-15:35	0.001	2.24	0.023	0.430	2.20	0.450	0.209	0.122	1.5

TABLE # 10AMBIENT AIR SURVEY IN MISSISSAUGA

Units - PPM

GROUND LEVEL CONCENTRATIONS IN THE VICINITY OF GULF and TRICIL

MONITORING LOCATION / NUMBER	DATE APRIL 1978	MONITORING TIME START / END	INSTANTANEOUS CONCENTRATION				MAXIMUM 30-MINUTE AVERAGE CONCENTRATION		MONITORING PERIOD AVERAGE CONCENTRATION		SCAN TIME Min.
			CO		THC		CO	THC	CO	THC	
			Min.	Max.	Min.	Max.					
MISSISSAUGA II #1	10	15:00-11:30	0.642	59.3	1.75	12.5	8.90	3.80	2.96	2.47	1.5
" #2	11	13:07-09:37	0.001	13.0	0.001	2.13	13.0	2.0	6.42	0.553	10
" #3	12	14:26-11:16	0.001	0.700	1.53	10.9	0.460	8.50	0.089	3.76	10
" #4	13	13:04-11:19	0.001	10.3	1.50	3.28	8.8	3.10	4.05	2.28	10
" #5	14-15	13:28-13:58	0.001	18.2	0.001	6.98	11.0	5.0	0.39	0.637	5
" #6	15	14:48-11:48	0.001	1.76	0.001	3.28	1.10	2.50	0.120	1.87	5
" #7	16	14:04-10:04	0.001	43.0	0.001	26.7	21.0	13.0	1.57	1.60	5
" #8	17	15:04-11:49	0.001	106	0.001	32.3	54.7	16.8	3.87	2.14	2.5
" #9	18	12:10-20:40	0.001	1.82	1.74	5.19	0.370	3.20	0.079	2.14	2.5
" #10	18	21:05-09:35	0.001	3.87	1.78	14.5	1.20	4.50	0.173	2.60	2.5
" #11	19	12:50-14:20	0.185	2.62	2.04	5.39	1.66	3.59	1.06	3.04	2.5
" #12	19	14:34-11:04	0.001	5.09	1.68	4.34	2.00	2.60	0.261	2.18	2.5
" #13	20	13:26-10:11	0.001	16.7	1.77	5.12	14	3.30	4.23	2.26	2.5
" #14	21-22	13:30-18:00	0.001	3.45	1.84	9.17	2.90	3.40	1.16	2.41	2.5
" #15	22	18:35-15:35	0.001	16.4	1.75	32.2	0.79	5.7	0.083	2.47	1.5

TABLE # 11AMBIENT AIR SURVEY IN MISSISSAUGA

Units - PPM

GROUND LEVEL CONCENTRATIONS IN THE VICINITY OF GULF and TRICIL

MONITORING LOCATION / NUMBER	DATE APRIL 1978	MONITORING TIME START / END	INSTANTANEOUS CONCENTRATION				MAXIMUM 30-MINUTE AVERAGE CONCENTRATION		MONITORING PERIOD AVERAGE CONCENTRATION		SCAN TIME Min.
			H ₂ S		O ₃		H ₂ S	O ₃	H ₂ S	O ₃	
MISSISSAUGA II #1	10	15:00-11:30	0.001	0.047	0.001	0.042	0.031	0.041	0.001	0.033	1.5
" #2	11	13:07-09:37	0.001	0.009	0.013	0.039	0.009	0.038	0.001	0.030	10
" #3	12	14:26-11:16	0.001	0.038	0.001	0.053	0.033	0.051	0.005	0.034	10
" #4	13	13:04-11:19	0.001	0.018	0.019	0.038	0.017	0.038	0.004	0.028	10
" #5	14-15	13:28-13:58	0.010	0.043	0.006	0.038	0.037	0.037	0.015	0.028	5
" #6	15	14:48-11:48	0.001	0.012	0.001	0.033	0.008	0.032	0.001	0.018	5
" #7	16	14:04-10:04	0.001	0.021	0.001	0.052	0.015	0.052	0.001	0.008	5
" #8	17	15:04-11:49	0.001	0.020	0.001	0.050	0.017	0.049	0.004	0.018	2.5
" #9	18	12:10-20:40	0.001	0.016	0.040	0.056	0.012	0.056	0.004	0.049	2.5
" #10	18	21:05-09:35	0.001	0.004	0.033	0.049	0.003	0.049	0.001	0.042	2.5
" #11	19	12:50-14:20	0.007	0.014	0.039	0.045	0.013	0.044	0.011	0.043	2.5
" #12	19	14:34-11:04	0.001	0.001	0.007	0.046	0.007	0.046	0.004	0.032	2.5
" #13	20	13:26-10:11	0.001	0.013	0.009	0.038	0.011	0.037	0.002	0.026	2.5
" #14	21-22	13:30-18:00	0.001	0.013	0.001	0.055	0.011	0.054	0.005	0.033	2.5
" #15	22	18:35-15:35	0.001	0.039	0.001	0.053	0.017	0.050	0.001	0.024	1.5

TABLE # 12

HYDROCARBON ANALYSIS for MISSISSAUGA - 1978, units - ppm

MAP SITE	SAMPLING PERIOD (min).	DATE April 1978	LOCATION AND UTM COORDINATES	CH ₄	C ₂ H ₄	C ₂ H ₆	C ₂ H ₂	C ₃ H ₆ & C ₃ H ₈	CYCLO-PROPANE	VINYL CHLORIDE MONOMER	C ₄ H ₁₀	C ₅ H ₁₂	C ₆ H ₁₄
5	24	14	MOE Sewage Plant (06117 - 48162)	1.01	0.25	trace	trace	0.01	-	-	0.12	trace	-
5	20	14	MOE Sewage Plant (06117 - 48162)	1.07	0.15	trace	trace	trace	0.01	-	0.08	trace	-
6	15	17	Tree Nursery West of Gulf (06114 - 48173)	0.98	trace	trace	0.01	-	-	0.01	trace	-	-
6A	43	17	Intersection of Orr Rd. & Southdown Road (06113-48177)	1.03	0.09	trace	0.08	0.11	-	0.06	0.08	0.02	-
6	35	18	Tree Nuserly West of Gulf (06114 - 48173)	0.96	0.03	trace	0.01	trace	-	-	0.05	-	-
7	45	19	Gulf Parking Lot (06119 - 48166)	1.18	0.02	trace	0.01	0.08	-	0.24	0.14	0.03	-
2	45	20	Lakeshore & Southdown Rds. (06122-48167)	1.13	0.09	0.01	0.01	trace	-	trace	trace	-	-
2	30	21	Lakeshore & Southdown Rds. (06122-48167)	0.08	0.05	0.01	0.01	0.04	trace	trace	trace	-	-
2	45	21	Lakeshore & Southdown Rds. (06122 - 48167)	0.08	0.33	trace	0.02	0.03	-	trace	0.06	-	-
			AVERAGE	0.84	0.11	0.006	0.018	0.032	0.006	0.038	0.061	0.009	0.005
			STANDARD DEVIATION	0.43	0.11	0.002	0.024	0.039	0.002	0.078	0.050	0.009	-

HI-VOL ANALYSIS FOR Mississauga, 19 78

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